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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,730	06/13/2005	Olivier Guerret	FR-AM1907 NP	6786
31684 7590 09/08/2008 ARKEMA INC. PATENT DEPARTMENT - 26TH FLOOR 2000 MARKET STREET PHILADELPHIA, PA 19103-3222				
EXAMINER BERNSHTEYN, MICHAEL				
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1796				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/538,730

**Applicant(s)**

GUERRET, OLIVIER

**Examiner**

MICHAEL M. BERNSTEYN

**Art Unit**

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 2, 4-11, 13 and 17-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-10, 13 and 17-21 is/are rejected.
- 7) ☒ Claim(s) 1 and 8-11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This Office Action follows a response filed on June 25, 2008. Claim 1 has been amended; claim 3 has been cancelled; no claims have been added.
2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 25, 2008 has been entered.
3. In view of amendment(s) and remarks the rejection of claim 11 under 35 U.S.C. 103(a) as being unpatentable as obvious over Nesvadba et al. (U.S. Patent 6,262,206) has been withdrawn.
4. Applicant's arguments with respect to claims 1-11, 13 and 17-21 have been considered but are moot in view of the new ground(s) of rejection.
5. Claims 1, 2, 4-11, 13, and 17-21 are pending.

### ***Claim Objections***

6. Claim 1 is objected to because of the following informalities: claim 1, line 7 recites the limitation "said monomer units comprising a gradient copolymer", which is improper and should be deleted.
7. Claims 8 and 9 are objected to because of the following informalities: the use of the phrase "preferably" to link a broad range of values with a narrow range of values

renders the claims awkward and not in the compliance with the current US practice. It is not clear which range controls the actual metes and bounds of the claimed subject matter. It is suggested to put preferable range in the dependent claims.

8. Claim 10 is objected to because of the following informalities. The recitation "particularly" is objected because it is unclear whether the limitations following the phrase are part of the claimed invention.

Appropriate correction is required.

#### ***Specification***

9. The disclosure is objected to because of the following informalities: the specification contains a diagrammatic representation of the copolymer, which should have the dark spheres, which are missing (page 18, lines 15-22).

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 19 is dependent upon claim 3 which has been cancelled.

***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***Claim Rejections - 35 USC § 103***

11. The text of this section of Title 35 U.S.C. not included in this action can be found in a prior Office Action.

12. Claims 1, 2 4-10, 13 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable as obvious over Nesvadba et al. (U.S. Patent 6,262,206), for the rationale recited in paragraph 3 of Office Action dated October 4, 2007, and comments below.

13. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable as obvious over Nesvadba et al. (U.S. Patent 6,262,206), for the rationale recited in paragraph 6 of Office Action dated March 26, 2008, and comments below.

14. Claims 1, 2 4, 6-7, 18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Matyjaszewski et al. "Gradient copolymers by atom transfer radical polymerization", J. Phys. Org. Chem., 2000, 13, p. 775-786.

With regard to the limitations of claims 1, 2, 4, and 18, Matyjaszewski discloses that gradient copolymers have a continuous change in composition from one end of the chain to the other. In order to achieve this continuous change in instantaneous composition, all chains must be initiated simultaneously, and must survive until the end of the polymerization. Therefore, a living (ionic) or controlled/living radical polymerization technique must be employed, as the significant presence of chain-

breaking reactions would lead to heterogeneity in both composition and molecular weight (page 775, right column through page 776, left column).

Gradient copolymers may be prepared via ATRP copolymerization of two or more monomers with different homopolymerization reactivity ratios (e.g.,  $r_1 \gg r_2$ , where  $r_1$  may be greater than 1 and  $r_2$  may be less than 1). As the differences in the two values of reactivity ratio increase, so does the steepness of the gradient in instantaneous composition (pages 777-778).

Matyjaszewski exemplifies that both gradient copolymers of styrene and acrylonitrile containing 59 mol% acrylonitrile had number average molecular weights of 11,000 and 15,000, and polydispersities 1.15 and 1.08; all these values are within the claimed ranges (page 783, Fig. 13). These copolymers meet the limitations for the specific values for the range of  $Tg_1$  and  $Tg_2$  as per claims 1 and 7.

With regard to the limitations of claims 6, 7 and 20, Matyjaszewski exemplifies the simultaneous radical copolymerization of styrene and n-butyl acrylate, and methyl methacrylate and n-butyl acrylate in bulk at 90-110°C, which is within the claimed range (pages 780-781, Fig. 5-7).

With regard to the limitations of claims 1 and 7, Matyjaszewski does not disclose that said copolymer comprising at least one monomer  $M_i$  such that the probability of encountering  $M_i$  in any standardized position  $x$  situated on the polymer chain is nonzero; and wherein said gradient copolymer is soluble or dispersible in both water and in organic solvents.

However, in view of substantially identical monomers, their weight amounts, the obtained copolymer having a number average molecular weight and a polydispersity within the claimed ranges, between Matyjaszewski and instant claims, it is the examiner position that Matyjaszewski's gradient copolymer inherently possesses these properties. Since the USPTO does not have equipment to do the analytical test, the burden is now shifted to the applicant to prove otherwise. In re Fitzgerald 619 F 2d 67, 70, 205 USPQ 594, 596 (CCPA 1980).

15. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matyjaszewski et al. as applied to claims 1, 2 4-7, 18 and 20 above, and further in view of Farcet et al. "Nitroxide-mediated miniemulsion polymerization of n-butyl acrylate: synthesis of controlled homopolymers and gradient copolymers with styrene", Macromolecular Symposia (2002), 182, (3rd IUPAC-Sponsored International Symposium on Free-Radical Polymerization: Kinetics and Mechanism), 2001, 249-260 (see SRNT dated on September 19, 2007, pages 48-49).

With regard to the limitations of claims 8-10, Matyjaszewski discloses that the introduction of new more universal nitroxide mediators will allow for the the synthesis of a wide range of gradient copolymers with acrylates and acrylamides (page 779, left column).

Matyjaszewski does not disclose the usage of the claimed nitroxide comprising a phosphonate group, and alkoxyamine.

Farcet discloses that a controlled free-radical homopolymerization of butyl acrylate and its copolymerization with styrene have been studied in aqueous

miniemulsion, using an acyclic  $\beta$ -phosphonylated nitroxide as a mediator, the N-tert-butyl-N-(l-diethylphosphono-2,2-dimethylpropyl) nitroxide, also called SG1, and alkoxyamine. Polymerization kinetics have been studied and characterization of the (co)polymers has been performed, demonstrating the successful synthesis of well-defined poly(butyl acrylate) homopolymers and poly(butyl acrylate-co-styrene) gradient copolymers (abstract).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the mixture of the above mentioned phosphonate-containing nitroxide and alkoxyamine as taught by Farcet in Matyjaszewski's process for producing a gradient copolymer with reasonable expectation of success in order to obtain well-defined poly(butyl acrylate) homopolymers and poly(butyl acrylate-co-styrene) gradient copolymers (Farcet, abstract), and thus to arrive at the subject matter of instant claims 8-10.

16. Claims 13 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Matyjaszewski et al. "Gradient copolymers by atom transfer radical polymerization", J. Phys. Org. Chem., 2000, 13, p. 775-786, as applied to claims 1, 2 4-7, 18 and 20 above, and further in view of Matyjaszewski et al. (U. S. Patent 5,807,937).

The disclosure of Matyjaszewski's reference resided in § 14 is incorporated herein by reference.

With regard to the limitations of claims 13 and 21, Matyjaszewski's Chem does not disclose a paint, adhesive, glue or cosmetic formulation comprising the gradient copolymer of claim 1, wherein said formulation is an aqueous-based formulation.



With regard to the limitations of claims 13 and 21, Matyjaszewski'937 discloses that the novel (co)polymers, including gradient copolymers are useful in a wide variety of applications (for example, as **adhesives**, in contact lenses, as detergents, diagnostic agents and supports therefor, dispersants, emulsifiers, elastomers, engineering resins, viscosity index improvers, in ink and imaging compositions, as leather and cement modifiers, lubricants and/or surfactants, with **paints** and coatings, as paper additives and coating agents, in textiles, as water treatment chemicals, in the chemical and chemical waste processing, composite fabrication, **cosmetics**, hair products, personal care products in plastics compounding as, for example, an antistatic agent, in food and beverage packaging, pharmaceuticals, etc. (col. 6, lines 45-61).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the gradient copolymers of in a wide variety of applications as taught by Matyjaszewski'937, such as paint, adhesive, glue or cosmetic formulation with reasonable expectation of success because analogous gradient copolymers were already successfully used for these applications (Matyjaszewski'937, col. 6, lines 45-61), and thus to arrive at the subject matter of instant claims 13 and 21.

#### ***Allowable Subject Matter***

17. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the present claims are allowable over the closest references: Nesvadba et al. (U.S. Patent 6,262,206), Matyjaszewski et al. (U. S. Patent 5,807,937), and Matyjaszewski et al. "Gradient copolymers by atom transfer radical polymerization", J. Phys. Org. Chem., 2000, 13, p. 775-786.

However, these entire references do not disclose or fairly suggest the claimed process for the aqueous dissolution of the gradient copolymer of claim 1 comprising:

1) dissolving the copolymer in a ketone solution, at a level of solid of between 20 and 90%; 2) neutralizing the solution obtained in 1, if necessary, by addition of a molar solution either of acid or of base, the acid or base choice being conditioned by the chemical nature of the hydrophilic monomer; 3) adding water, with vigorous stirring, to the solution obtained in 1 or optionally in 2 in a proportion such that the level of solid obtained is between 1 and 80%; optionally, the water can be replaced by water/alcohol mixtures in proportions ranging from 99/1 to 50/50; 4) evaporating the ketone until the desired level of solid is obtained, as is recited in claim 11.

As of the date of this Notice of Allowability, the Examiner has not located or identified any reference that can be used singularly or in combination with another references including the above mentioned references to render the present invention anticipated or obvious to one of ordinary skill in the art.

In the light of the above discussion, it is evident as to why the present claim is patentable over the prior art.

***Response to Arguments***

18. Applicant's arguments filed May 27, 2008 have been fully considered but they are not persuasive.

19. It appears that the focal Applicants argument resides in the following: 1. Applicant's claimed combination involves the combination of the following key elements - said combination not being taught or suggested by the '206: a) a gradient polymer; b) more than 50% of at least one monomer having a Tg of less than 20°C (for the homopolymer); c) less than 50% of at least one monomer having a Tg of over 20°C (for the homopolymer); d) at least one of the monomers is hydrophilic and makes up at least 5% of the copolymer; 2. There is no teaching of this combination of elements and limitations in the '206 reference. (Example B 15 contains 3 of the 4 elements); 3. The '206 reference does not recognize the result of a gradient polymer composition having a solubility in both water and organic solvents. This solubility is related to both monomer ratio and monomer choice; 4. The '206 reference teaches away from Applicant's claimed combination of elements.

20. It is noted that Nesvadba clearly discloses that the present invention encompasses in the synthesis novel **gradient copolymers** (col. 12, lines 56-59). Furthermore it is not necessary to calculate the number of examples with corresponding monomers and molecular weight, which are within the claimed ranges, and are out of the claimed ranges. It is well settled that "an applied reference may be relied upon for all that it would have reasonably suggested to one of ordinary skill in the art, including not only preferred embodiment, but less preferred and even non preferred". *Merck & Co. v.*

*Biocraft Laboratories*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989).

21. In response to Applicants arguments regarding solubility in both water and organic solvents, and the specific values for the range of Tg<sub>1</sub> and Tg<sub>2</sub>, it is worth to mention that Nesvadba clearly discloses that the process may be carried out in the presence of an organic solvent or in the presence of water or in mixtures of organic solvents and water. Additional cosolvents or surfactants, such as glycols or ammonium salts of fatty acids, may be present (col. 9, lines 62-66). Furthermore, in view of substantially identical monomers, their weight amounts, the obtained copolymer having a number average molecular weight and a polydispersity within the claimed ranges, between Nesvadba and instant claims, it is the examiner position that Nesvadba's copolymer inherently possesses these properties. Since the USPTO does not have equipment to do the analytical test, the burden is now shifted to the applicant to prove otherwise. *In re Fitzgerald* 619 F 2d 67, 70, 205 USPQ 594, 596 (CCPA 1980).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL M. BERNSHTEYN whose telephone number is (571)272-2411. The examiner can normally be reached on M-Th 8-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael M. Bernshteyn/  
Examiner, Art Unit 1796

/M. M. B./  
Examiner, Art Unit 1796